

Title: Pizza Patterns

Brief Overview:

Students will identify, create, and extend simple patterns. Students will be introduced to this unit with the book, “Pete’s A Pizza” by William Steig.

NCTM 2000 Principles for School Mathematics:

Equity: *Excellence in mathematics education requires equity - high expectations and strong support for all students.*

Curriculum: *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*

Teaching: *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*

Learning: *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*

Assessment: *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*

Technology: *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students’ learning.*

Links to NCTM 2000 Standards:

Content Standards

Algebra

Understand patterns, relationships, and functions
Analyze change in various contexts

Geometry

Use visualization, spatial reasoning, and geometric modeling to solve problems

Process Standards

Problem Solving

Build new mathematical knowledge through problem solving.
Solve problems that arise in other contexts.
Apply and adapt a variety of appropriate strategies to solve problems.
Monitor and reflect on the process of mathematical problem solving.

Reasoning and Proof

Recognize reasoning and proof as fundamental aspects of mathematics.

Develop and investigate mathematical conjectures.
Select and use various types of reasoning and methods of proof.

Communication

Organize and consolidate their mathematical thinking through communication.
Use the language of mathematics to express mathematical ideas precisely.
Analyze and evaluate their mathematical thinking.
Communicate their mathematical thinking coherently and clearly to peers and teachers.

Connections

Recognize and apply mathematics in context outside of mathematics.
Recognize and use connections among mathematical ideas.

Representation

Create and use representations to organize, record, and communicate mathematical ideas.
Use representations to model and interpret physical, social, and mathematical phenomena.
Select, apply, and translate among mathematical representations to solve problems.

Grade/Level:

Grades 1-2/Also appropriate for older, lower-ability students

Duration/Length:

Three days/45-60 minutes a day. The unit will vary depending on student ability level.

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

Basic shape recognition
Color recognition
Ability to duplicate a pattern when presented with a model

Student Outcomes:

Students will be able to:

Duplicate/copy patterns
Identify patterns
Continue patterns
Describe a pattern
Create a pattern
Work cooperatively in groups

Materials/Resources/Printed Materials:

Pete's A Pizza, by William Steig

Velcro or magnetic board with motion symbol cards, pizza topping cards, and letter cards
Chart paper

Empty pizza boxes (enough to have one per four students) with 4 pre-made pattern sentence strips glued onto the bottom

Unifix cubes

Pattern blocks for each student (one tub per four students)

Teacher Resource Sheets #1-5

Student Resource Sheets #1-5

Task Cards

Crayons

Sentence strip pattern cards labeled as AABB, ABC, ABAC, AABBC

Rubber stamps or stickers

Development/Procedures:

Day One

Read "*Pete's A Pizza*" as a motivational activity to introduce patterning.

Ask students to name the pizza toppings in the book and brainstorm additional possible toppings. Teacher will list toppings on chart paper.

Tell students that they will be learning a pizza pattern dance. Students will be taught patterns initially through the use of motion symbols, then through the use of pizza topping picture symbols, and finally through the use of letters.

Introduce students to a simple ABAB pattern through "clap, stomp, clap, stomp" symbols (Teacher Resource Sheet #1).

Use pizza toppings to create same ABAB pattern (Teacher Resource Sheet #2). Have students clap and stomp using the designated pizza topping to represent each motion (i.e. pepperoni = A and clap, sausage = B and stomp).

Continue with lesson in this manner using different patterns (i.e. AAB, ABB, ABC, etc.).

An example of an AAB pattern would be pepperoni, pepperoni, and sausage. An example of an ABB pattern would be pepperoni, sausage, and sausage. An example of an ABC pattern would be pepperoni, sausage, and green pepper.

After students exhibit a basic understanding of simple patterns, divide the class into cooperative learning groups of 4 students each.

Give each group a pizza box with pre-made pattern strips and unifix cubes. Each pizza box should have 4 sentence strips glued to the bottom inside half. Each sentence strip should have a picture of unifix cubes that shows a specific pattern (i.e. red, red, brown would represent AAB or red, brown, red, brown would represent ABAB).

Each student will duplicate one pattern strip model using unifix cubes.

Students will then work together to identify the patterns on the unifix cubes using letters.

Students will record in their math journals what they have learned about patterns.

Day Two

Begin lesson by having a few students share their math journal reflections as a review of yesterday's lesson.

Ask, "Could we make a pattern using pattern blocks?" Model responses for students with pattern blocks, repeating the core pattern at least three times.

Have students identify the patterns that were created using letters.

Introduce the vocabulary: **core**, **pattern**, **term** and sequence (Teacher Resource Sheet #3)

Show students how to repeat a pattern by finding the core and repeating it for three additional terms.

Hand out Student Resource Sheet #1 and have students use pattern blocks to make examples that repeat each core three times.

Break into cooperative learning groups.

Give each student a copy of the hundred's chart (Student Resource Sheet #2) and give each group one task card.

Using crayons, have each student follow the directions on the task card to shade in the appropriate squares on the hundred's chart to create a pattern.

When completed, teacher will show each group's pattern and discuss it with the class.

Students will each be given a unifix strip (Student Resource Sheet #3). They must refer to the patterns on Student Resource Sheet #1 and color their unifix strip based on one of those four patterns.

Students will tape their colored unifix strip in their math journal and explain the pattern and identify it using the appropriate letters.

Day Three

Teacher will have sentence strips on the wall with the following patterns written on them: AABB, ABC, ABAC, AABBC.

Students will remove their colored unifix strip from their day #2 journal entry. They will place their strip on the wall under the appropriate letter pattern.

After patterns have been displayed, the class will discuss their placement and correct any mistakes. They will then compare and contrast the patterns.

Real-Life Connection: Students will be given Student Resource Sheet #4. They will develop and create a placemat using a variety of rubber stamps, drawings and/or stickers following the directions on the resource sheet.

Students will use their math journal to explain their placemat pattern.

Performance Assessment:

With students in the primary grades, teacher observation is critical. The following techniques could be used to record student progress: clipboard notes (Attach an index card for each student to a clipboard and make notes as you observe students working throughout the units), student interview, journal writing, and/or classroom observation checklist. If additional information is needed, the teacher can distribute Student Resource Sheet #5 and use the scoring key (Teacher Resource Sheet #4) to evaluate student achievement.

Extension/Follow Up:

Teacher will have students' placemats laminated. Students will use placemats at a culmination pizza party. Students could make their own pizza using a cookie sheet instead of a pizza pan. (See Teacher Resource Sheet #5 for pizza recipe.) They can follow teacher-made patterns to place the toppings on the pizza.

Additional literature connections:

- *Curious George and the Pizza*, by Margaret Rey
- *Pizza Fun*, by Judy Bastyra
- *Pizza Pat*, by Will Terry
- *The Little Red Hen Makes a Pizza*, by Philemon Sturges
- *Nothing Beats a Pizza*, by Loris Lesynski
- *Huggly's Pizza*, by Tedd Arnold

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AABB

ABC

ABAC

AABBCC

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Task #1:

Color in the number 10. Continue counting by tens, coloring the square of each multiple of ten. Do you notice a pattern?

Task #2:

Shade square number 3. Skip the next 2 squares and shade number 6. Skip two more squares and shade the next number. Continue skipping 2 squares and shading until you reach 99. Do you see a pattern?

Task #3:

Shade square number 4. Skip the next 3 squares and shade number 8. Continue skipping 3 squares and shading the fourth, until the board is shaded with multiples of four. Do you see a pattern?

Task #4:

Shade square number 8. Count 8 more squares and shade number 16. Continue to shade every 8 squares until square 96 is shaded. Do you see a pattern?

Task #5:

Shade square number 9. Count 9 more squares and shade number 18. Continue to shade every 9 squares until you reach square number 99. Do you see a pattern?

Task #6:

Shade square number 5. Shade square number 10. Continue counting by fives, shading each multiple of 5, until you reach square number 100. Do you see a pattern?

Task #7:

Color squares 1 to 9 with nine different colors. Use the color of square 1 to color in all the squares whose digits add up to 1 (10: $1 + 0 = 1$). Use the color of square 2 to color in all squares whose digits add up to 2 (11: $1 + 1 = 2$). If the sum of 2 digits is a two-digit number, add the sum digits again to get a one-digit number (46: $4 + 6 = 10$, $10: 1 + 0 = 1$). Do you see a pattern?

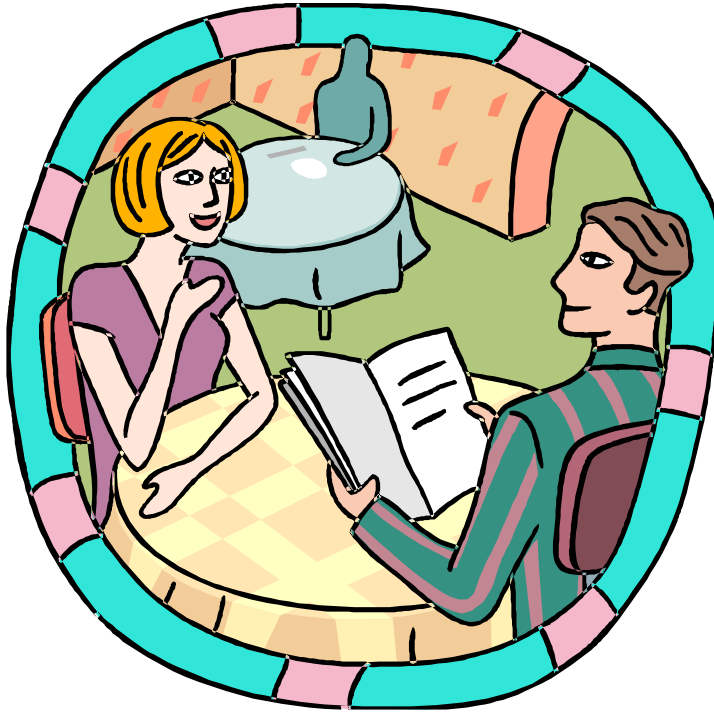
Student Resource Sheet #3

[illegible][illegible][illegible]



Mr. DeMartino, owner of Pappy's Pizza, is sponsoring a contest. You must design a placemat using what you have learned about patterns. Use stickers, stamps, and/or crayons to create a simple pattern that goes around the entire placemat border.

The winning placemat will be featured in his restaurant during the summer. Be sure to begin your pattern in the top left-hand corner of this placemat and continue in a clockwise movement around the entire outside perimeter. Good luck!!



Mr. DeMartino was delighted with the results of the placemat contest. He loved the patterns that were created and decided to use them to redecorate Pappy's Pizza restaurant's banquet room. An example of the tablecloth is drawn below. You must create a pattern by coloring the blocks on the tablecloth. Then, you need to identify the pattern you designed using letters.

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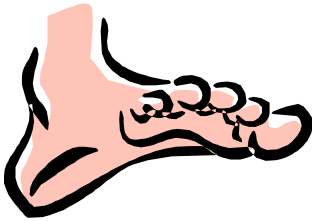
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CLAP



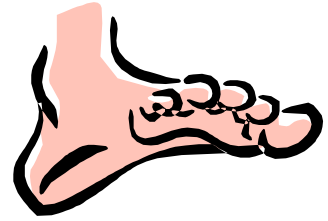
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STOMP



STOMP



STOMP



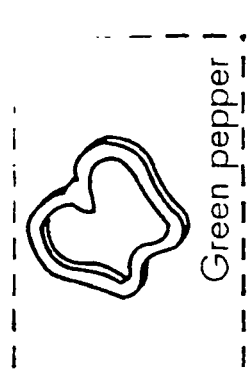
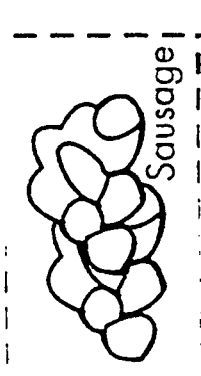
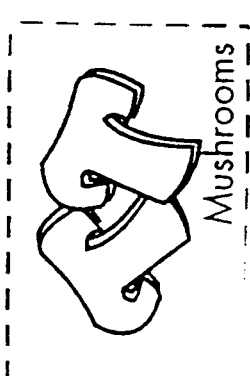
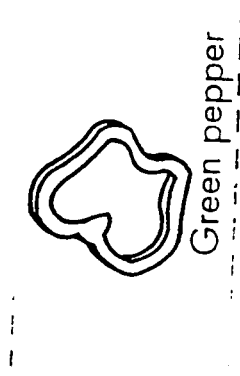
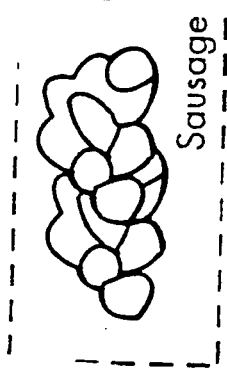
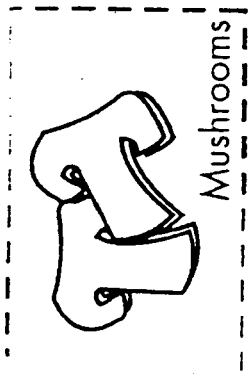
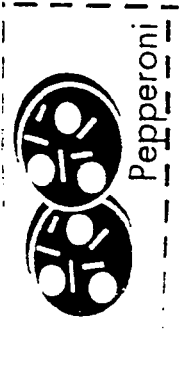
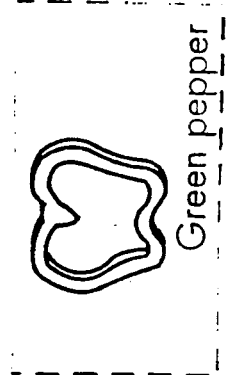
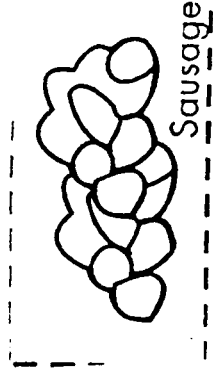
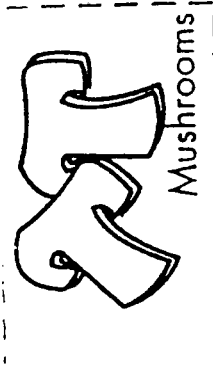
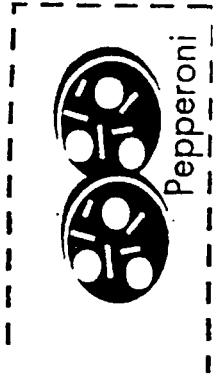
JUMP



JUMP



JUMP



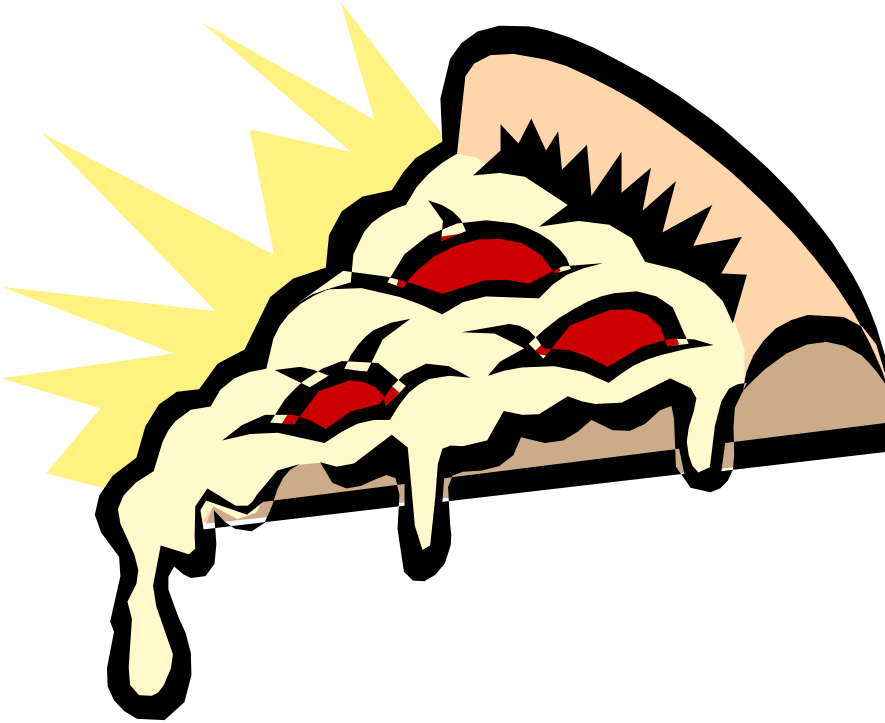
Vocabulary

Pattern – A pattern is a sequence of objects, numbers, colors, etc. that repeats.

Sequence – A set of objects or numbers arranged in a special order or pattern.

Core – The core is the smallest part of the pattern that is repeated. The core should be repeated multiple times.

Term - A term is each place or position in the sequence.



Scoring Key For Pizza Patterns Assessment

3 – Pattern contains a core that is repeated at least three times. Student is able to identify the pattern using letters.

2 – Pattern contains a core that is repeated at least two times. Student may or may not be able to identify the pattern using letters.

1 – Student is able to create a pattern, but repeats a core only one time. Student may or may not be able to identify the pattern using letters.

0 – No pattern is visible.



YUMMY PIZZA RECIPE

Ingredients

Pinch of salt

3 Tbsp. Butter

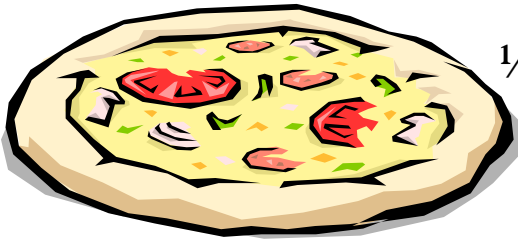
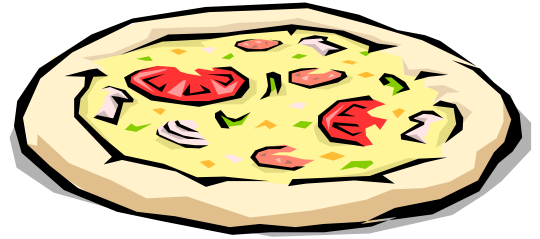
3 to 4 Tbsp. Milk

$\frac{3}{4}$ cup self-rising flour

1 8-oz. Can pizza sauce

$\frac{1}{4}$ cup shredded cheese

Toppings of choice



Directions:

1. Preheat oven to 425 degrees.
2. Put flour, salt, and butter in a mixing bowl.
3. Cut butter into small pieces.
4. Rub butter into flour until mixture looks like bread crumbs.
5. Add the shredded cheese and milk to the flour mixture. Mix until a smooth ball of dough forms.
6. Divide the dough in half and make each half into a ball. Roll each ball flat. Place on a rectangular baking sheet.
7. Spoon the pizza sauce over the dough.
8. Add toppings and additional cheese.
9. Bake for 15-20 minutes or until edges are golden brown.